

## REMARKS

Applicants have withdrawn Claims 11-37, 49-51, and 63-83 as being drawn to non-elected inventions. Applicants reserve the right to prosecute the subject matter of these claims in one or more continuation or divisional applications. Applicants also have cancelled Claims 40 and 54; have amended Claims 38-39, 41, 45, 47-48, 52-53, 55, 59, and 61-62; and have added new Claims 84-88.

Enabling support for the amendments can be found in the application as filed, and therefore, no new matter is contained in the amendments and additions. Reconsideration of the present application and allowance of resulting Claims 38-39, 41-48, 52-53, 61-62, and 84-88 is respectfully requested in view of the amendments and following remarks.

### I. Election/Restrictions

The Office Action made final the previous restriction requirement. Accordingly, Applicants have withdrawn Claims 11-37, 49-51, and 63-83 as being drawn to non-elected inventions. Applicants reserve the right to prosecute the subject matter of these claims in one or more continuation or divisional applications.

### II. Objections

The Office Action objected to location of the cross-reference to the provisional application on which this application depends. Applicants respectfully submit that the proposed amendments to the specification render this objection moot.

The Office Action also objected to the abstract as not complying with 37 C.F.R. § 1.72(b) because the abstract was in two paragraphs. Applicants respectfully submit that the abstract has been amended and now consists of a single paragraph.

The Office Action also objected to the specification as improperly incorporating subject matter into the specification by including an embedded hyperlink. Applicants respectfully submit that the hyperlinks have been deleted.

The Office Action also objected to the use of the terms “acetohydroxyacid synthase” and “acetolactate synthase” interchangeably for the definition of the term “ahas.” Applicants

respectfully submit that the enzyme acetohydroxyacid synthase (AHAS) is also known in the literature as acetolactate synthase (ALS). See, e.g., Pang et al., 2003, "Molecular basis of sulfonylurea herbicide inhibition of acetohydroxyacid synthase," J. Biol. Chem. 278(9):7639-44. Acetohydroxyacid synthase (AHAS) (acetolactate synthase, EC 4.1.3.18) catalyzes the first step in branched-chain amino acid biosynthesis (the decarboxylation of pyruvate and its combination with another 2-ketoacid to produce an acetohydroxyacid) and is the target for sulfonylurea and imidazolinone herbicides.

### **III. Rejection Under 35 U.S.C. § 112, First Paragraph**

The Office Action rejected Claims 38-40, 42-48, 52-54, and 56-62 under 35 U.S.C. § 112, first paragraph, as not being enabling. The Office Action acknowledges that the specification is enabling for the *Synechocystis* PCC 6803 polynucleotides of SEQ ID NOS:6 and 17, which encode the AHAS large and small subunits. The Office Action asserts that the specification is not enabling for polynucleotides encoding the AHAS large and small subunits from other cyanobacterial species; for AHAS large and small subunit genes conferring resistance to an herbicide; for vectors comprising such polynucleotides; for nuclear genomes comprising the vector; for plastomes comprising the vector or a transgenic plant produced from the transformation of the replicable expression vector or its progeny. Applicants respectfully submit that the claims as amended are enabled by the specification.

Claims 38 and 52 have been amended to specify that the claimed polynucleotides have at least 90% sequence identity with the disclosed sequences and confer resistance to an herbicide selected from the group consisting of an imidazolinone, a sulfonylurea, and a sulfanylcaboxamide. The specification teaches the construction of both nuclear expression vectors (See page 39, line 23 to page 44, line 4) and plastidic expression vectors (See page 46, lines 4-20) comprising the claimed polynucleotides. The specification also teaches methods of transforming a plant with either the nuclear or plastid expression vector (See page 44, lines 8-18 and page 46, line 22 to page 48, line 9). The specification further teaches that the disclosed sequences confer upon a transgenic plant increased resistance to an imidazolinone and a sulfonylurea as compared to a wild type plant (See page 48, line 12 to page 50, line 9).

Accordingly, Applicants respectfully submit that the present specification is enabling for AHAS large and small subunit genes conferring resistance to an herbicide; for vectors comprising such polynucleotides; for nuclear genomes comprising the vector; for plastomes comprising the vector or a transgenic plant produced from the transformation of the replicable expression vector or its progeny. Moreover, Applicants also respectfully submit that the specification is enabling for polynucleotides having at least 90% sequence identity with the disclosed sequences. One of ordinary skill in the art would expect that a polynucleotide with at least 90% sequence identity with the disclosed sequence would be likely to exhibit the same activity as the disclosed sequence. Given the disclosure of this specification regarding methods to assay the resistance to various herbicides, it would be a simple screen to determine that such a polynucleotide would be encompassed by the claims.

Applicants respectfully submit that the amendments to Claims 38 and 52 overcome this rejection. Accordingly, Applicants respectfully request that the rejections under § 112, first paragraph with respect to enablement be withdrawn.

#### **IV. Rejection Under 35 U.S.C. § 112, First Paragraph**

The Office Action rejected Claims 38-40, 42-48, 52-54, and 56-62 under 35 U.S.C. § 112, first paragraph as failing to comply with the written description requirement, asserting that the claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. In particular, the Office Action notes that the specification only discloses a single representative species of the AHAS large and small subunit nucleic acids and that the specification does not disclose a particular structure to a function or activity in the disclosed species. Applicants respectfully submit that the claims as amended are directed to subject matter clearly and sufficiently described in the specification such that one of ordinary skill in the art would understand that Applicants were in possession of the claimed invention at the time of filing of the application.

As discussed above, Claims 38 and 52 have been amended to specify that the claimed polynucleotides have at least 90% sequence identity with the disclosed sequences and confer

increased resistance to an herbicide selected from the group consisting of an imidazolinone, a sulfonylurea, and a sulfanylcboxamide. The application teaches that the disclosed sequences confer upon a transgenic plant increased resistance to an imidazolinone and a sulfonylurea as compared to a wild type plant (See pages 48-50). One of ordinary skill in the art would expect that a polynucleotide with at least 90% sequence identity with the disclosed sequence would be likely to exhibit the same activity as the disclosed sequence. Given the disclosure of this application regarding methods to assay the resistance to the herbicides, it would be a simple screen to determine that such a polynucleotide would be encompassed by the claims. Therefore, one of ordinary skill in the art would understand that Applicants were in possession of the claimed invention at the time of filing of the application.

Applicants respectfully submit that the claims as amended meet the requirements set forth in 35 U.S.C. § 112, first paragraph. Accordingly, Applicants respectfully request that the rejections under 35 U.S.C. § 112, first paragraph with respect to the written description requirement be withdrawn.

#### VI. Rejections Under 35 U.S.C. § 112, Second Paragraph

The Office Action rejected Claims 38-48 and 52-62 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicants respectfully submit that the present amendments to the claims render this rejection moot.

The Office Action rejected Claims 38 and 52, and Claims 39-48 and 53-62 depending therefrom, as being indefinite in the recitation of the term “AHAS.” As noted above, the enzyme acetohydroxyacid synthase (AHAS) is also known in the literature as acetolactate synthase (ALS). Applicants have amended Claims 38 and 52 to replace the term “AHAS” with the phrase “acetohydroxyacid synthase (AHAS).”

The Office Action rejected Claim 39 as being indefinite in the use of the phrase “cyanobacterium is extracted from *Synechocystis*.” Applicants respectfully submit that the present amendments to the claims render moot this rejection.

The Office Action rejected Claim 53 as being indefinite in the use of the phrase “wherein the cyanobacterium *Synechocystis* PCC 6803.” Applicants respectfully submit that the present amendments to the claims render moot this rejection.

Applicants respectfully submit that the claims as amended meet the requirements set forth in 35 U.S.C. § 112, second paragraph. Accordingly, Applicants respectfully request that the rejections under 35 U.S.C. § 112, second paragraph be withdrawn.

#### VI. Rejection of Priority Claim

The Office Action asserted that the priority document (U.S. Provisional Application Serial No. 60/214,705) was not enabling with respect to the claimed invention because the provisional application did not contain a sequence listing, the sequences of SEQ ID NOS: 6 and 17, or Figures 11-15 which describe the AHAS gene constructs. Accordingly, the Office Action evaluated the prior art, utilizing the filing date of this application (June 27, 2001) as the effective filing date as opposed to the filing date of the priority application. Applicants respectfully submit that the present application is entitled to the filing date of the priority application.

Applicants respectfully submit that the priority application was enabling for the claimed invention. Although the sequences were not specifically disclosed in the provisional application, Applicants were clearly in possession of the AHAS large and small subunit sequences from *Synechocystis* PCC 6803 and provided sufficient description within the specification to enable one of ordinary skill in the art to practice the invention as claimed. The provisional application describes the methods used for the isolation of the full-length AHAS large subunit sequence from *Synechocystis* PCC 6803 and for its use to complement an AHAS deficient *E. coli* strain on pages 23-24. The provisional application notes that the isolated clone of the AHAS large subunit sequence contained an open reading frame encoding a predicted polypeptide of 625 amino acids that had 49% identity to the *E. coli* ilvg AHAS gene, 47% identity to the maize *als2* gene, 46% identity to the *Arabidopsis* AHAS gene, and 65% identity to the sequence of the AHAS gene from *S. platensis*. The provisional application further discloses the methods used to clone the AHAS small subunit from *Synechocystis* PCC6803 . For these reasons, Applicants respectfully submit that the present application is entitled to the filing date of the priority application.

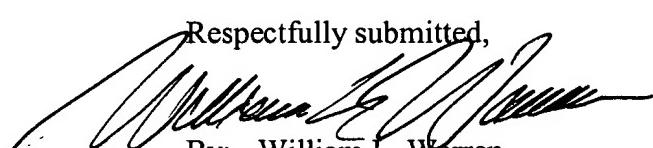
**VII. Rejections Under 35 U.S.C. § 102**

The Office Action rejected Claims 38 and 42 under 35 U.S.C. § 102(b) as being anticipated by Milano et al. (1992) J. Gen. Microbiol. 138:1399-1408. In particular, the Office Action asserts that Milano et al. teach the characterization of the large subunit of the acetohydroxyacid synthase from the cyanobacterium *Spirulina platensis*. Applicants respectfully submit that this objection is rendered moot by the present amendments to the claims. Accordingly, Applicants respectfully request that the rejections under 35 U.S.C. § 102(b) be withdrawn.

**VIII. Conclusion**

Applicants believe that the present application, as amended, is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested. The foregoing is submitted as a full and complete response to the Office Action mailed August 18, 2004. No additional fees are believed to be due, however, the Commissioner is hereby authorized to charge any additional fees due or credit any overpayment to Deposit Account No. 19-5029. If there are any issues that can be resolved by a telephone conference or an Examiner's amendment, the Examiner is invited to call the undersigned attorney at (404) 853-8081.

Respectfully submitted,



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